

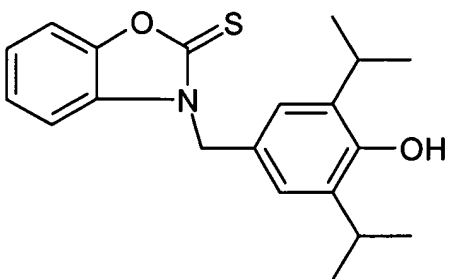
**1. (original)** Method of coloring a polymeric material, wherein a polymeric material containing

- a) a phenolic antioxidant and/or a phenolic ultraviolet absorber and
- b) a colour former

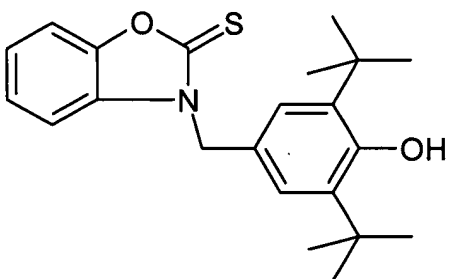
The chemical structure shows a central carbon atom bonded to three 3,5-dimethyl-4-hydroxyphenyl groups. Each phenyl ring has a hydroxyl group (OH) at the para position and two methyl groups at the meta positions relative to the central carbon attachment point.

CC(C)(C)c1cc(O)ccc1CN2C(=S)Sc3ccccc23CC(C)(C)c1cc(cc(c1C(C)(C)C)SC2=CC=CC=N2)O

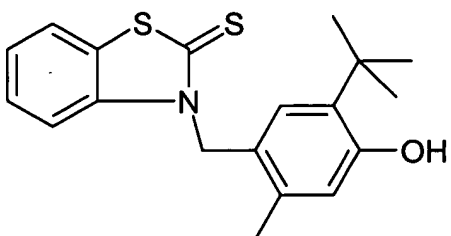
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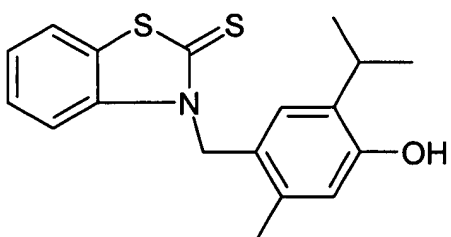
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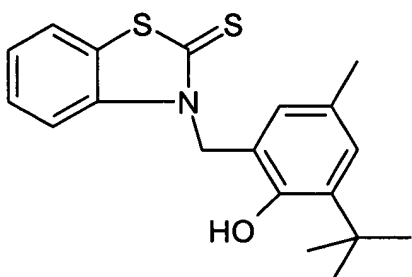
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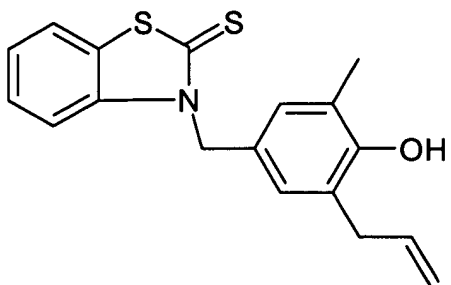
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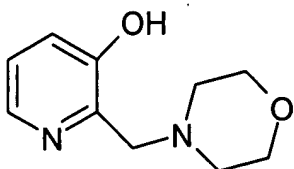
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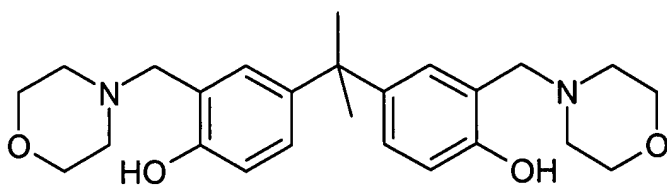
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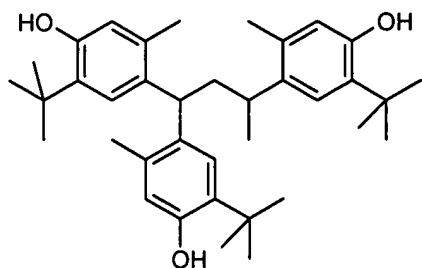
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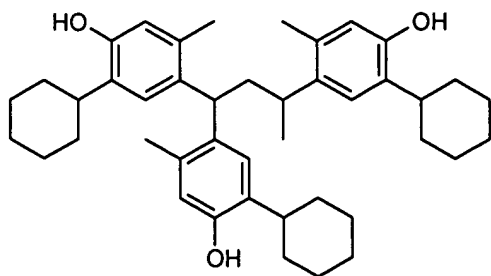
(11)



(12)



(13)



(14).

**2. (currently amended)** Method according to claim 1, wherein the radiation of higher energy than visible light is selected from ultraviolet light, X-ray, gamma radiation and particle radiation[**[,]**]

~~especially from ultraviolet laser or ultraviolet lamp radiation of 285 to 400 nm, electron radiation, X-ray and gamma radiation.~~

**3. (currently amended)** Method according to claim 1, wherein component (a) is a compound comprising one or more mono-hydroxyphenyl moieties, each carrying one or two bonds to either a linking group connecting the moiety with 1 to 3 further moieties of the same type or to an anchor group,

and optionally 1-3 further substituents selected from alkyl of 1 to 12 carbon atoms,

where the linking groups are di-, tri- or tetravalent aliphatic groups of 1 to 20 carbon atoms and

divalent linking groups are selected from

alkylene which may be interrupted and/or end-capped with -O-, -NH-, -S-, -CO-, -COO-, -OCO-,

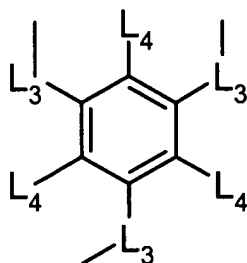
-NHCO-, -CONH-, a group L<sub>1</sub>, phenylene~~[[.]]~~ or phenylene which is substituted by C<sub>1</sub>-C<sub>12</sub>alkyl and/or C<sub>1</sub>-C<sub>12</sub>alkoxy and/or C<sub>2</sub>-C<sub>12</sub>alkanoyloxy and/or C<sub>3</sub>-C<sub>12</sub>alkenoyloxy;

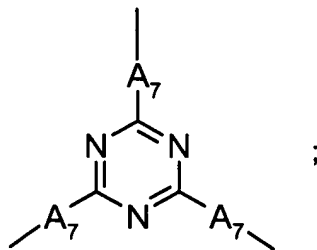
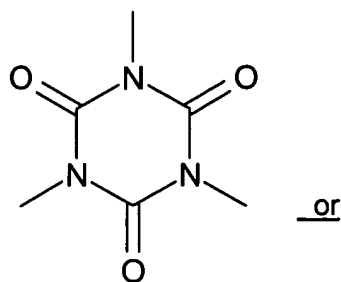
divalent mono-, di- or tricycloalkylene groups; divalent mono-, di- or tricycloalkylene groups interrupted by -O-; ~~spacer groups~~ -O-, -NH-, -S-, -CO-, -COO-, -OCO-, -NHCO-; and -CONH-;

trivalent groups are selected from

trivalent alkyl groups of 3 to 20 carbon atoms; said trivalent alkyl groups interrupted and/or end-

capped with -O-, -NH-, -S-, -CO-, -COO-, -OCO-, -NHCO-, -CONH-, a group L<sub>1</sub>, phenylene~~[[.]]~~ or phenylene which is substituted by C<sub>1</sub>-C<sub>12</sub>alkyl and/or C<sub>1</sub>-C<sub>12</sub>alkoxy and/or C<sub>2</sub>-C<sub>12</sub>alkanoyloxy and/or C<sub>3</sub>-C<sub>12</sub>alkenoyloxy; and/or trivalent groups of the formulae



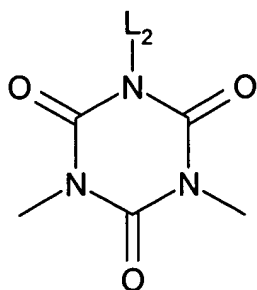


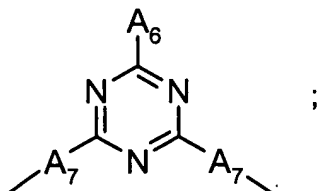
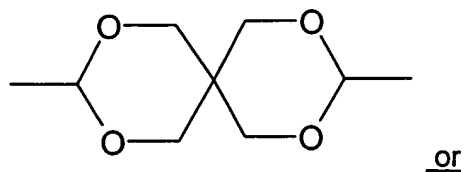
tetravalent groups are selected from

tetravalent alkyl groups of 4 to 20 carbon atoms; and said tetravalent alkyl groups interrupted and/or end-capped with -O-, -NH-, -S-, -CO-, -COO-, -OCO-, -NHCO-, -CONH-, a group L<sub>1</sub>, phenylene[[,]] or phenylene which is substituted by C<sub>1</sub>-C<sub>12</sub>alkyl and/or C<sub>1</sub>-C<sub>12</sub>alkoxy and/or C<sub>2</sub>-C<sub>12</sub>alkanoyloxy and/or C<sub>3</sub>-C<sub>12</sub>alkenoyloxy;

wherein

L<sub>1</sub> is a group selected from the formulae





L<sub>2</sub> is OH, C<sub>1</sub>-C<sub>12</sub>alkyl, C<sub>1</sub>-C<sub>12</sub>alkoxy, C<sub>2</sub>-C<sub>12</sub>hydroxyalkyl; or C<sub>2</sub>-C<sub>12</sub>hydroxyalkoxy;

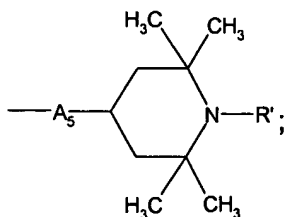
L<sub>3</sub> independently are C<sub>1</sub>-C<sub>4</sub>alkylene;

L<sub>4</sub> independently are H or C<sub>1</sub>-C<sub>4</sub>alkyl; and

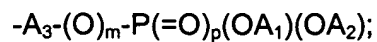
anchor groups are selected from

C<sub>1</sub>-C<sub>22</sub>alkyl; C<sub>1</sub>-C<sub>22</sub>alkyl-A<sub>5</sub>-; C<sub>2</sub>-C<sub>22</sub>alkyl interrupted by -A<sub>5</sub>-; -A<sub>4</sub>-phenyl; -A<sub>4</sub>-phenyl where the phenyl core is substituted by C<sub>1</sub>-C<sub>12</sub>alkyl, C<sub>1</sub>-C<sub>12</sub>alkoxy, C<sub>2</sub>-C<sub>12</sub>alkanoyloxy and/or C<sub>3</sub>-C<sub>12</sub>alkenoyloxy;

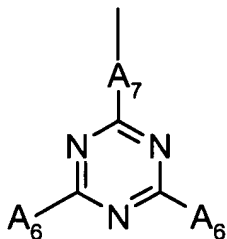
C<sub>1</sub>-C<sub>8</sub>alkyl substituted by a group of the formula



and phosphite, phosphate or phosphonate ester groups[[, e.g.]] of the formula



or the anchor group is of the formula



where m and p independently are 0 or 1;

A<sub>1</sub> and A<sub>2</sub> independently are C<sub>1</sub>-C<sub>12</sub>alkyl or phenyl or phenyl substituted by C<sub>1</sub>-C<sub>12</sub>alkyl or an equivalent of an alkaline, alkaline earth or aluminum atom;

A<sub>3</sub> is a direct bond or C<sub>1</sub>-C<sub>8</sub>alkylene;

A<sub>4</sub> is selected from C<sub>1</sub>-C<sub>8</sub>alkylene and A<sub>5</sub>;

A<sub>5</sub> is selected from -O-, -NH-, -S-, -CO-, -COO-, -OCO-, -NHCO-**[[:]]** and -CONH-;

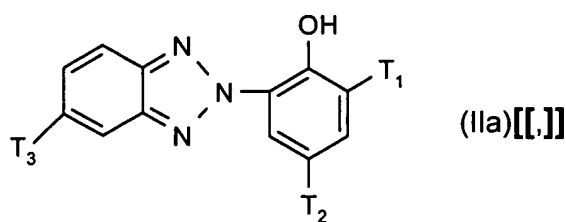
A<sub>6</sub> is selected from C<sub>1</sub>-C<sub>18</sub>alkoxy, C<sub>1</sub>-C<sub>18</sub>alkylthio and C<sub>1</sub>-C<sub>18</sub>alkylamino;

A<sub>7</sub> is -O- or -NH-;

R' is H, C<sub>1</sub>-C<sub>18</sub>alkyl, C<sub>1</sub>-C<sub>18</sub>alkoxy or cyclohexyloxy**[[:]]**;

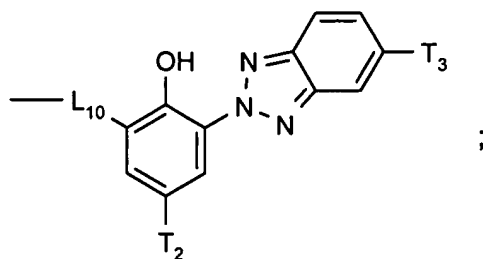
or the anchor group is C<sub>3</sub>-C<sub>22</sub>alkylene or C<sub>3</sub>-C<sub>22</sub>oxaalkylene attached with both open bonds to adjacent carbon atoms of the mono-hydroxyphenyl moiety; or

component (a) can also be a phenolic UV absorber compound selected from benzotriazoles of the formula (IIa), 2-hydroxybenzophenones of the formula (IIb)**[[:]]** and 2-hydroxyphenyltriazines of formula (IIc):



wherein T<sub>1</sub> is hydrogen, C<sub>1</sub>-C<sub>18</sub>alkyl, or C<sub>1</sub>-C<sub>18</sub>alkyl which is substituted by phenyl,

or T<sub>1</sub> is a group of the formula



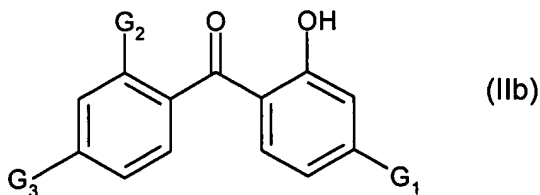
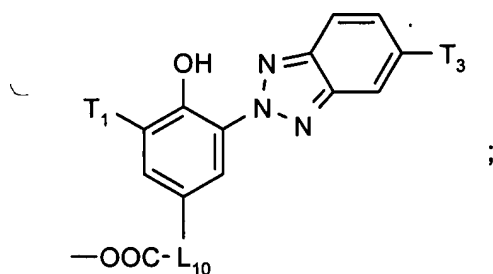
L<sub>10</sub> is a divalent group ~~[[, ]]~~for example ~~-(CH<sub>2</sub>)<sub>n</sub>-~~, where n is from the range 1-8;

T<sub>2</sub> is hydrogen, C<sub>1</sub>-C<sub>18</sub>alkyl, or is C<sub>1</sub>-C<sub>18</sub>alkyl which is substituted by COOT<sub>5</sub>, C<sub>1</sub>-C<sub>18</sub>alkoxy, hydroxyl, phenyl or C<sub>2</sub>-C<sub>18</sub>acyloxy;

T<sub>3</sub> is hydrogen, halogen, C<sub>1</sub>-C<sub>18</sub>alkyl, C<sub>1</sub>-C<sub>18</sub>alkoxy, C<sub>2</sub>-C<sub>18</sub>acyloxy, perfluoroalkyl of 1 to 12 carbon atoms ~~such as -CF<sub>3</sub>,~~ or T<sub>3</sub> is phenyl; and

T<sub>5</sub> is C<sub>1</sub>-C<sub>18</sub>alkyl or C<sub>4</sub>-C<sub>50</sub>alkyl interrupted by one or more O and/or substituted by OH or by

a group

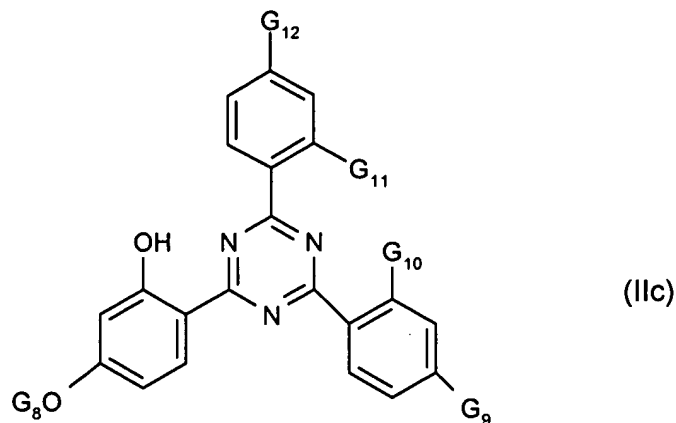


(IIb)

wherein

G<sub>1</sub>, G<sub>2</sub> and G<sub>3</sub> independently are hydrogen, hydroxy or C<sub>1</sub>-C<sub>18</sub>alkoxy;



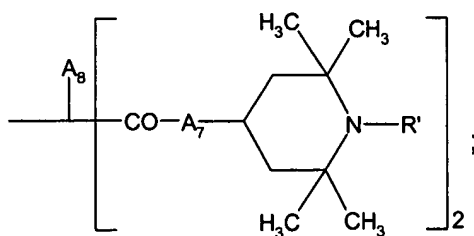


wherein

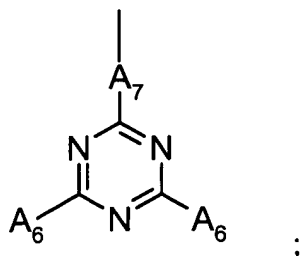
$G_8$  is  $C_1$ - $C_{18}$ alkyl, or is  $C_4$ - $C_{18}$ alkyl which is interrupted by COO or OCO or O, or is interrupted by O and substituted by OH; and

$G_9$ ,  $G_{10}$ ,  $G_{11}$  and  $G_{12}$  independently are hydrogen, methyl, hydroxy or  $OG_8$ ; and  $G_9$  and  $G_{12}$  also comprise phenyl.

**4. (currently amended)** Method according to claim 3, wherein the anchor groups are selected from tertiary  $C_4$ - $C_{12}$ alkyl;  $C_1$ - $C_{22}$ alkyl- $A_5$ -;  $C_2$ - $C_{22}$ alkyl interrupted by - $A_5$ -; - $A_5$ -phenyl; - $A_5$ -phenyl where the phenyl core is substituted by  $C_1$ - $C_{12}$ alkyl; and - $A_4$ -phenyl where the phenyl core is substituted by  $C_2$ - $C_{12}$ alkanoyloxy and/or  $C_3$ - $C_{12}$ alkenoyloxy, and optionally further by  $C_1$ - $C_{12}$ alkyl; or the anchor group is  $C_3$ - $C_{22}$ alkylene or  $C_3$ - $C_{22}$ oxaalkylene attached with both open bonds to adjacent carbon atoms of the mono-hydroxyphenyl moiety; or is a group of one the formulae



$-A_3-(O)_m-P(=O)_p(OA_1)(OA_2)$ ; or



where m and p independently are 0 or 1;

A<sub>1</sub> and A<sub>2</sub> independently are C<sub>1</sub>-C<sub>12</sub>alkyl or phenyl or phenyl substituted by C<sub>1</sub>-C<sub>12</sub>alkyl or an equivalent of an alkaline, alkaline earth or aluminum atom;

A<sub>3</sub> is a direct bond or C<sub>1</sub>-C<sub>8</sub>alkylene;

A<sub>4</sub> is selected from C<sub>1</sub>-C<sub>8</sub>alkylene, -O-, -NH-, -S-, -CO-, -COO-, -OCO-, -NHCO-**[[.]]** and -CONH-;

A<sub>5</sub> is selected from -O-, -NH-, -S-, -CO-, -COO-, -OCO-, -NHCO-**[[.]]** and -CONH-;

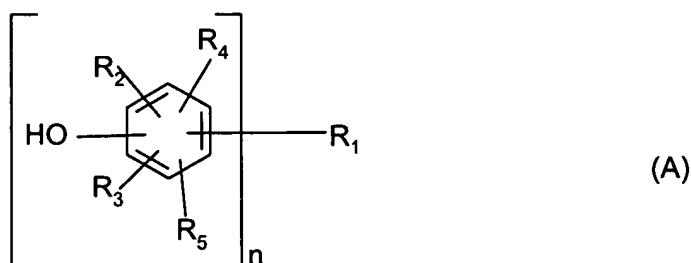
A<sub>6</sub> is selected from C<sub>1</sub>-C<sub>18</sub>alkoxy, C<sub>1</sub>-C<sub>18</sub>alkylthio and C<sub>1</sub>-C<sub>18</sub>alkylamino;

A<sub>7</sub> is -O- or -NH-;

A<sub>8</sub> is C<sub>1</sub>-C<sub>7</sub>alkyl; and

R' is C<sub>1</sub>-C<sub>18</sub>alkyl.

**5. (currently amended)** Method according to claim 3, wherein component (a) is a compound of the formula (A)



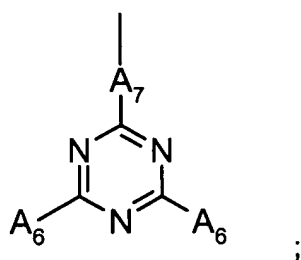
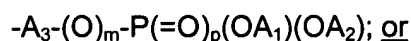
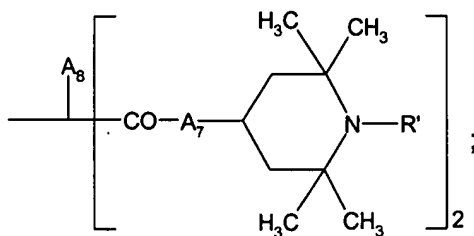
wherein

R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> independently are hydrogen, methyl or tertiary C<sub>4</sub>-C<sub>12</sub>alkyl**[[.]]**~~especially methyl, tert. butyl and tert. pentyl;~~

n is from the range 1-4:

when n is 1,

R<sub>1</sub> is tertiary C<sub>4</sub>-C<sub>12</sub>alkyl; C<sub>1</sub>-C<sub>22</sub>alkyl-A<sub>5</sub>-; C<sub>2</sub>-C<sub>22</sub>alkyl interrupted by -A<sub>5</sub>-; -A<sub>5</sub>-phenyl; -A<sub>5</sub>-phenyl where the phenyl core is substituted by C<sub>1</sub>-C<sub>12</sub>alkyl; -A<sub>4</sub>-phenyl where the phenyl core is substituted by C<sub>2</sub>-C<sub>12</sub>alkanoyloxy and/or C<sub>3</sub>-C<sub>12</sub>alkenoyloxy, and optionally further by C<sub>1</sub>-C<sub>12</sub>alkyl; or R<sub>1</sub> together with R<sub>5</sub> is C<sub>3</sub>-C<sub>22</sub>alkylene or C<sub>3</sub>-C<sub>22</sub>oxaalkylene attached with both open bonds to adjacent carbon atoms of the mono-hydroxyphenyl moiety; or is a group of one the formulae



where m and p independently are 0 or 1;

A<sub>1</sub> and A<sub>2</sub> independently are C<sub>1</sub>-C<sub>12</sub>alkyl or phenyl or phenyl substituted by C<sub>1</sub>-C<sub>12</sub>alkyl or an equivalent of an alkaline, alkaline earth or aluminum atom;

A<sub>3</sub> is a direct bond or C<sub>1</sub>-C<sub>8</sub>alkylene;

A<sub>4</sub> is selected from C<sub>1</sub>-C<sub>8</sub>alkylene, -O-, -NH-, -S-, -CO-, -COO-, -OCO-, -NHCO-**[[.]]** and -CONH-;

A<sub>5</sub> is selected from -O-, -NH-, -S-, -CO-, -COO-, -OCO-, -NHCO-**[[.]]** and -CONH-;

A<sub>6</sub> is selected from C<sub>1</sub>-C<sub>18</sub>alkoxy, C<sub>1</sub>-C<sub>18</sub>alkylthio and C<sub>1</sub>-C<sub>18</sub>alkylamino;

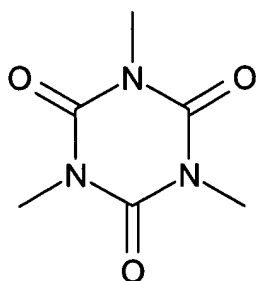
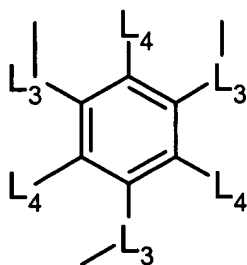
A<sub>7</sub> is -O- or -NH-;

A<sub>8</sub> is C<sub>1</sub>-C<sub>7</sub>alkyl; and

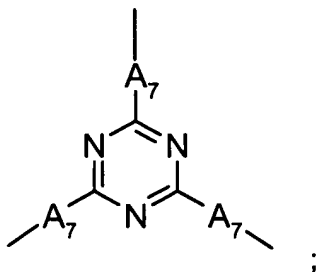
R' is C<sub>1</sub>-C<sub>18</sub>alkyl;

when n is 2, R<sub>1</sub> is C<sub>1</sub>-C<sub>20</sub>alkylene which may be interrupted and/or end-capped with -O-, -NH-, -S-, -CO-, -COO-, -OCO-, -NHCO-, -CONH-, -L<sub>1</sub>-, phenylene, phenylene which is substituted by C<sub>1</sub>-C<sub>12</sub>alkyl and/or C<sub>1</sub>-C<sub>12</sub>alkoxy and/or C<sub>2</sub>-C<sub>12</sub>alkanoyloxy and/or C<sub>3</sub>-C<sub>12</sub>alkenoyloxy; divalent mono-, di- or tricycloalkylene groups; divalent mono-, di- or tricycloalkylene groups interrupted by -O-; ~~spacer groups~~ -O-; -NH-; -S-; -CO-; -COO-; -OCO-; -NHCO-; or -CONH-;

when n is 3, R<sub>1</sub> is trivalent alkyl of 3 to 20 carbon atoms; said trivalent alkyl interrupted or end-capped with -O-, -NH-, -S-, -CO-, -COO-, -OCO-, -NHCO-, -CONH-, -L<sub>1</sub>-, phenylene[[,]] or phenylene which is substituted by C<sub>1</sub>-C<sub>12</sub>alkyl and/or C<sub>1</sub>-C<sub>12</sub>alkoxy and/or C<sub>2</sub>-C<sub>12</sub>alkanoyloxy and/or C<sub>3</sub>-C<sub>12</sub>alkenoyloxy; or trivalent groups of the formulae



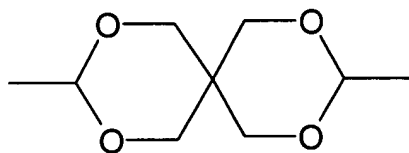
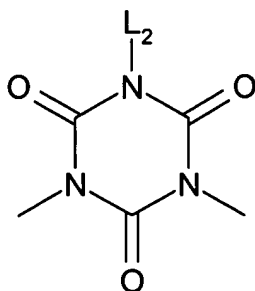
or



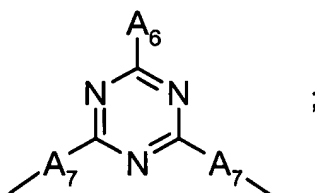
when n is 4, R<sub>1</sub> is tetravalent alkyl of 4 to 20 carbon atoms; said tetravalent alkyl interrupted or end-capped with -O-, -NH-, -S-, -CO-, -COO-, -OCO-, -NHCO-, -CONH-, -L<sub>1</sub>-, phenylene[[,]] or phenylene

which is substituted by C<sub>1</sub>-C<sub>12</sub>alkyl and/or C<sub>1</sub>-C<sub>12</sub>alkoxy and/or C<sub>2</sub>-C<sub>12</sub>alkanoyloxy and/or C<sub>3</sub>-C<sub>12</sub>alkenoyloxy;

L<sub>1</sub> is a group selected from the formulae



and



L<sub>2</sub> is OH, C<sub>1</sub>-C<sub>12</sub>alkyl, C<sub>1</sub>-C<sub>12</sub>alkoxy, C<sub>2</sub>-C<sub>12</sub>hydroxyalkyl; or C<sub>2</sub>-C<sub>12</sub>hydroxyalkoxy;

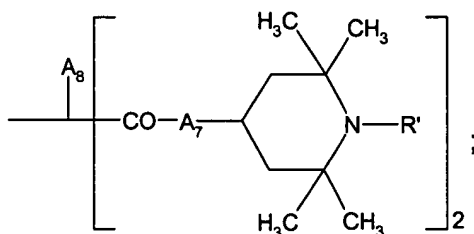
L<sub>3</sub> independently are C<sub>1</sub>-C<sub>4</sub>alkylene; and

L<sub>4</sub> independently are H or C<sub>1</sub>-C<sub>4</sub>alkyl.

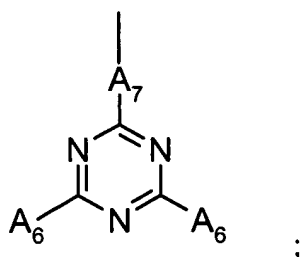
**6. (currently amended)** Method according to claim 5, wherein R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> independently are hydrogen, methyl, tert[[.]]-butyl[[.]] or tert[[.]]-pentyl;

when n is 1,

R<sub>1</sub> is tertiary butyl, tertiary pentyl; C<sub>1</sub>-C<sub>22</sub>alkyl-A<sub>5</sub>-; C<sub>2</sub>-C<sub>22</sub>alkyl interrupted by -A<sub>5</sub>-; -A<sub>5</sub>-phenyl where the phenyl core is substituted by C<sub>1</sub>-C<sub>12</sub>alkyl; -A<sub>4</sub>-phenyl where the phenyl core is substituted by C<sub>3</sub>-C<sub>4</sub>alkenoyloxy and C<sub>1</sub>-C<sub>12</sub>alkyl; or R<sub>1</sub> together with R<sub>5</sub> is C<sub>3</sub>-C<sub>22</sub>alkylene or C<sub>3</sub>-C<sub>22</sub>oxaalkylene attached with both open bonds to adjacent carbon atoms of the mono-hydroxyphenyl moiety; or R<sub>1</sub> is a group of one the formulae



-A<sub>3</sub>-P(=O)(OA<sub>1</sub>)(OA<sub>2</sub>); or



where

A<sub>1</sub> and A<sub>2</sub> independently are C<sub>1</sub>-C<sub>4</sub>alkyl or an equivalent of a metal atom selected from Li, Na, K, ½ Mg, ½ Ca[[.]] and 1/3 Al;

A<sub>3</sub> is methylene;

A<sub>4</sub> is C<sub>1</sub>-C<sub>8</sub>alkylene;

A<sub>5</sub> is selected from -O-, -S-, -COO-, -OCO-, -NHCO-[[.]] and -CONH-;

A<sub>6</sub> is selected from C<sub>4</sub>-C<sub>18</sub>alkylthio and C<sub>4</sub>-C<sub>18</sub>alkylamino;

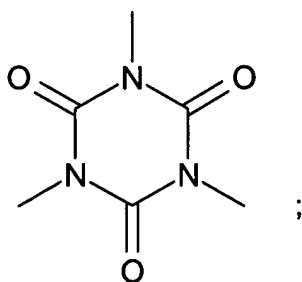
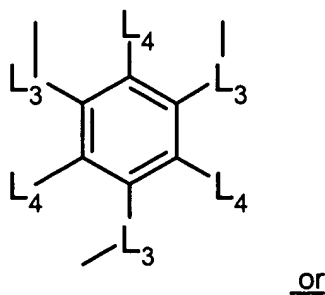
A<sub>7</sub> is -NH-;

A<sub>8</sub> is C<sub>1</sub>-C<sub>7</sub>alkyl; and

R' is C<sub>1</sub>-C<sub>18</sub>alkyl;

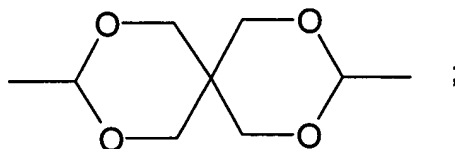
when n is 2, R<sub>1</sub> is C<sub>1</sub>-C<sub>12</sub>alkylene; C<sub>2</sub>-C<sub>20</sub>alkylene interrupted and/or end-capped with -O-, -S-, -COO-, -OCO-, -NHCO-, -CONH-[[,]] or -L<sub>1</sub>-; or R<sub>1</sub> is a divalent mono-, di- or tricycloalkylene group; or R<sub>1</sub> is -O-; -NH-; or -S-;

when n is 3, R<sub>1</sub> is trivalent alkyl of 3 to 20 carbon atoms; said trivalent alkyl interrupted by -O-, -S-, -COO-, -OCO-, -NHCO-, -CONH-, phenylene[[,]] or phenylene which is substituted by C<sub>1</sub>-C<sub>12</sub>alkyl; or R<sub>1</sub> is a trivalent group of one of the formulae



when n is 4, R<sub>1</sub> is tetravalent alkyl of 4 to 20 carbon atoms; or said tetravalent alkyl interrupted by -O-, -S-, -COO-, -OCO-, -NHCO-[[,]] or -CONH-; and

L<sub>1</sub> is a group of the formula



L<sub>3</sub> independently are C<sub>1</sub>-C<sub>4</sub>alkylene; and

L<sub>4</sub> independently are H or C<sub>1</sub>-C<sub>4</sub>alkyl.

7. **(currently amended)** Method according to claim 1, wherein the colour former is a triphenylmethane, lactone, benzoxazine, spiropyran, ~~or preferably~~ fluoran or phthalide.

8. **(original)** Method according to claim 1, wherein the polymeric material contains 0.001 to 10 % by weight of the phenolic antioxidant and/or phenolic UVA, based on the total weight of the polymeric material.

9. **(currently amended)** Method according to claim 1, wherein the polymeric material contains 0.001 to 10 % by weight ~~[[, ]] preferably 0.01 to 5 % by weight~~ of the colour former with respect to the total weight of the polymeric material.

10. **(original)** Method according to claim 1, wherein the polymeric material is a transparent thermoplast.

11. **(currently amended)** Method according to claim 1, wherein the polymeric material is selected from styrene acrylonitrile copolymer, polyolefin, polyvinylchloride, polychlorobutadiene, polyesters and glycol modified polyesters, polyacrylics, polystyrene, acrylonitrile styrene acrylate copolymer, polyamide, acrylonitrile styrene butadiene copolymer, polycarbonate ~~[[,]]~~ and/or blends or alloys thereof.

12. **(original)** Method of coloring a polymeric material, wherein a polymeric material containing  
c) a phenolic antioxidant, phenolic ultraviolet absorber and/or a latent acid, and  
d) a colour former  
is irradiated using a radiation of higher energy than ultraviolet light.



**13. (currently amended)** Protective clothing or mask or irradiation indicating tag, wherein a polymeric material comprising components (c) and (d) according to claim 12 in the form of a fiber, textile, nonwoven or film is contained on or visibly below the surface of the clothing, mask or tag.

**14. (currently amended)** Process for monitoring irradiation by X-ray or radioactive material, which process comprises placing a tag or sample of a polymeric material comprising components (c) and (d) according to claim 12 in the site to be controlled, and subsequently checking the colour of the tag or sample.

**15. (canceled)**

**16. (original)** Process of making a fiber or woven or non-woven fabric, which process comprises adding (a) a phenolic antioxidant and/or phenolic UVA and (b) a colour former to a synthetic polymer before or during the fiber melt spinning process.

**17. (new)** Method according to claim 1, wherein the radiation of higher energy than visible light is selected from ultraviolet laser or ultraviolet lamp radiation of 285 to 400 nm, electron radiation, X-ray and gamma radiation.

**18. (new)** Method according to claim 1, wherein the polymeric material contains 0.01 to 5 % by weight of the colour former with respect to the total weight of the polymeric material.